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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/750,142

12/31/2003

Anthony DiCarlo

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EXAMINER

VINH, LAN

ART UNIT

PAPER NUMBER

1765

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

12/21/2006

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/750,142

Applicant(s)

DICARLO ET AL.

Examiner

Lan Vinh

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-18 is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/20/2006 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 4-5, 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Parks et al. (US 4,646,424)

Parks discloses a method for deposition of gate electrode includes the step of removing pattern resist that remains after an etch of an underlying metal pattern (col 6, lines 55-60). The method comprises the steps of:

providing a wafer having an etched patterned titanium layer and an overlying mask pattern resist (col 6, lines 15-33)

cleaning the wafer with water (col 6, lines 18-21), which reads on cleaning the wafer with develop solution since the instant specification discloses that develop clean may include water (lines 20-25 on page 10 of the specification)

ashing the surface of the substrate (col 6, lines 44-46)

removing the remaining photoresist pattern by stripping after the cleaning and ashing step (col 6, lines 55-60), which reads on photochemically removing the pattern resist that remains after the cleaning and ashing since the applicants discloses that photochemically removing comprises stripping using a solution in page 11 of the specification

Regarding claims 4-5, Parks discloses substantially removing the remaining resist material/polymer skin from the photoresist pattern residue/hardened skin from the pattern (col 6, lines 43-46)

The limitation of claim 7 has been discussed above

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parks et al (US 4,646,424) in view of Chinn et al (US 2004/0053505A1)

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Parks method has been described above. Unlike the instant claimed inventions as per claims 3-4, Parks fails to specifically disclose that the wafer/semiconductor substrate is a micromechanical device/DMD wafer

Chinn, in a method for etching features, discloses that an etched silicon feature can be used in various MEMS/micromechanical devices (see abstract)

Hence, one skilled in the art at the time the invention was made would have found it obvious to employ Park etched structure as a micromechanical device in view of Chinn teaching because Chinn discloses that silicon structure can be used in a variety of MEMS applications, including MEMS in semiconductor device applications (col 6, paragraph 0066)

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Parks et al (US 4,646,424) in view of Nguyen et al (US 6,472,315)

Parks method has been described above. Unlike the instant claimed invention as per claim 6, Parks fails to specifically disclose performing the removing step with an acetate strip process

Nguyen discloses a method for fabricating an interconnect system comprises the step of removing a patterned photoresist with an acetate solution (col 5, lines 30-35)

Hence, one skilled in the art at the time the invention was made would have found it obvious to modify Parks method by performing the step of removing the photoresist with an acetate solution as per Nguyen because Nguyen discloses that the photoresist is essentially dissolved in a solution that includes ethylene acetate (col 5, lines 33-38)

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7. Claims 8, 11-12, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parks et al (US 4,646,424) in view of Park et al (US 2004/0063595 A1)

Parks discloses a method for deposition of gate electrode includes the step of forming a patterned layer over a layer 12/spacer layer. The method comprises the steps of:

- depositing layer 12/spacer layer between a layer and the substrate (col 6, lines 10-15; fig. 4D)

- depositing a titanium layer /material for the patterned layer (col 6, lines 15-20)

- depositing a pattern resist layer, patterning the metal layer, etching the resist layer and the metal layer/patterned layer (col 6, lines 17-32)

- cleaning a semiconductor substrate (col 6, lines 18-20)

- ashing the surface of the substrate after the cleaning step (col 6, lines 43-46)

- removing the remaining photoresist pattern by stripping composition after the cleaning and ashing step (col 6, lines 55-60), which reads on photochemically removing the pattern resist that remains after the cleaning and ashing since the applicants discloses that photochemically removing comprises stripping using a solution in page 11 of the specification

Although Parks discloses a step of cleaning unlike the instant claimed invention as per claim 8, Parks fails to specifically disclose cleaning the resist material and remaining material for the patterned layer with a develop solution after a step of etching resist material and a material layer

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Park discloses a method for stripping resist comprises a step of cleaning the resist material and remaining material for the patterned layer with DI water/develop solution after a step of etching resist material and a metallic/material layer (col 6, paragraph 0074)

Hence, one skilled in the art at the time the invention was made would have found it obvious to modify Parks method by adding of cleaning the resist material and remaining material for the patterned layer with DI water/develop solution after a step of etching resist material and a metallic/material layer as per Park because Park discloses that after the photoresist pattern are removed any dissolved photoresist may be rinsed using DI water (col 6, paragraph 0074)

Regarding claims 11-12, Parks discloses substantially removing the remaining resist material/polymer skin from the photoresist pattern residue/hardened skin from the pattern (col 6, lines 43-46)

The limitation of claim 14 has been discussed above

8. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parks et al (US 4,646,424) in view of Park et al (US 2004/0063595 A1) and further in view of Chinn et al (US 2004/0053505A1)

Parks as modified by Park has been described above. Unlike the instant claimed inventions as per claims 9-10, Parks as modified by Park fails to specifically disclose that the wafer/semiconductor substrate is a micromechanical device/DMD wafer

Chinn, in a method for etching features, discloses that an etched silicon feature can be used in various MEMS/micromechanical devices (see abstract)

Hence, one skilled in the art at the time the invention was made would have found it obvious to employ Parks etched structure as a micromechanical device in view of Chinn teaching because Chinn discloses that silicon structure can be used in a variety of MEMS applications, including MEMS in semiconductor device applications (col 6, paragraph 0066)

9. Claim 13 are rejected under 35 U.S.C. 103(a) as being under 35 U.S.C. 103(a) as being unpatentable over Parks et al (US 4,646,424) in view of Park et al (US 2004/0063595 A1) and further in view of Nguyen et al (US 6,472,315)

Parks as modified by Park method has been described above. Unlike the instant claimed inventions as per claim 13, Parks as modified by Park fails to specifically disclose performing the removing step with an acetate strip process

Nguyen discloses a method for fabricating an interconnect system comprises the step of removing a patterned photoresist with an acetate solution (col 5, lines 30-35)

Hence, one skilled in the art at the time the invention was made would have found it obvious to modify Parks and Park method by performing the step of removing the photoresist with an acetate solution as per Nguyen because Nguyen discloses that the photoresist is essentially dissolved in a solution that includes ethylene acetate (col 5, lines 33-38)

Allowable Subject Matter

10. . Claims 15-18 allowed.

The following is an examiner's statement of reasons for allowance:

Regarding claim 15, the cited prior art of record fails to disclose or suggest a method of forming a micromirror array comprises the step of "removing patternashing steps", in combination with the rest of the limitations of claim 15

Response to Arguments

11. Applicant's arguments with respect to the reference of Park et al (2004/0063595 A1) (have been considered but are moot in view of the new ground(s) of rejection of claims 1, 8 based on Parks et al (US 4,646,424). The applicants argue that Park (595) fails to disclose "providing a wafer having an etched patterned layer and an overlying mask pattern" and "cleaning the wafer with a develop solution". This argument is moot in view of Park (424) since Park discloses providing a wafer having an etched patterned titanium layer and an overlying mask pattern resist (col 6, lines 15-33) and cleaning the wafer with water (col 6, lines 18-21), which reads on cleaning the wafer with develop solution since the instant specification discloses that develop clean may include water (lines 20-25 on page 10 of the specification). The applicants also argue that Park (595) does not disclose "cleaning the resist material and remaining material for the patterned layer with a develop solution after said etching step". This argument is moot in view of Park (595) since Park (595) discloses a step of cleaning the resist material and

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remaining material for the patterned layer with DI water/develop solution after a step of etching resist material and a metallic/material layer

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 571 272 1471.

The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.



LV
December 18, 2006